



**US Department of Energy**  
Washington DC 20585

Thursday July 22, 2011

**Charge Letter:**

DOE Scientific Collaborations for Extreme-Scale Science Workshop: Charge, Scope, and Objective

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**From:**

The Next-generation Networks for Science (NGNS) Program  
Office of Advanced Scientific Computing Research  
Office of Science – US Department of Energy

**To:**

The organizing Committee  
Chair/co-chairs

**Charge:**

The Next-Generation Networks for Science (NGNS) program in the Office of Advanced Scientific Computing Research (ASCR) in the Office of Science at DOE requests that the network and the distributed systems communities hold a workshop with the main objective of identifying the grand challenges issues inhibiting the development, deployment, and operation of scalable and secure extreme-scale scientific collaborative environments. Extreme-scale scientific collaboration systems would enable new modalities of scientific discovery involving multi-disciplinary, multi-facility, and/or distributed research teams in the next decade in the Office of Science. A committee should be appointed and tasked with preparing a first draft outline of future scientific collaboration systems as basis for discussion during the workshop.

**Goals:**

- Identify the critical science drivers/challenges/opportunities for extreme-scale and data-intensive scientific collaboration in the DOE Office of Science
- Identify the technical challenges encountered in deploying and operating these collaborative technologies.
- Leverage the state-of-art Internet collaboration technologies and lessons learned from previous ASCR collaborative programs (e.g., DOE National Collaboratories, SciDAC, DOE2000) to specify the needs and capabilities of future scientific collaborations

- Carry out a synthesis of the exascale series workshop reports to ensure that scientific collaboration requirements for exascale science, data-intensive science, SciDAC-III, co-Design, and terabit networks are integrated into future scientific collaboration capabilities
- Produce a well-documented workshop report that articulates the research opportunities and challenges facing scientific collaborations in the era of extreme-scale data-intensive science.

**Background:**

For more than a decade, ASCR lead the nation in supporting research into large scale collaborative science environments. Notable examples include the DOE National Collaboratories program (<http://www.doecollaboratory.org/>) and the SciDAC I and SciDAC II programs (<http://www.scidac.gov/collabs.html>) grid projects. These programs have successfully promoted the creation and deployment of collaborative environments and tools principally serving Earth Sciences, High Energy, Nuclear Physics programs. Some notable accomplishments in this area include a) GridFTP data transfer toolkit used extensively for data movement, b) the foundational work on grid technology that enabled the formation of virtual science organizations among which the Open Science Grid (OSG), the Earth Systems Grid (ESG), numerous national and international grid projects, c) and more recently, middleware technologies to enable cloud computing.

In the coming decade, the DOE Office of Science anticipates that major science projects will need collaborative capabilities far beyond of current state-of-the art systems. These projects include exascale class supercomputers; data-intensive computing in major science domains; new ASCR initiatives (co-design and SciDAC-III); and the deployment of new complex science instruments such as NSLS-II, ITER, LHC, APS, LCLS. The main objective of this workshop is to bring together major stakeholders: domain scientists, network and middleware researchers, high-performance computing and networking facility operators to define the requirements of scientific collaboration capabilities for the next decade.

**Workshop Report:**

The outcome of the workshop should be a detailed report and a web-site that documents the findings, participant profiles, workshop activities (agendas, breakout sessions, presentations) and methodologies employed. The website should remain accessible after the workshop.

Richard Carlson  
Program Manager

7/27/11  
Date

Thomas Ndousse-Fetter  
Program Manager

7/27/11  
Date